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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ROY, SIKHA

ART UNIT PAPER NUMBER

2879

DATE MAILED: 11/18/2002

Please find below and or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/932,287

Applicant(s)

FUCHS ET AL.

Examiner

Sikha Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 17 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 17 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6,7
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

The drawings in Figs 1, 2 are objected to because of the following informality.

In Figs. 1,2 the heating tube (2) and cooling tube (3) are shown with small circles. It is not very clear whether these circles represent exact positions of the tubes passing perpendicularly to the plane or they just show as label for the elements.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 16 is objected to because of the following informalities:

Claim 16, line 2 "radio" should be replaced by --ratio--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3,5 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent 5,382,805 to Fannon et al.

Fannon et al. disclose (column 3 lines 35-48, column 4 lines 55-65, column 5 lines 33-38 Figs. 1 and 4) a coolable infrared emitter 10 comprising one heating tube 12 having gas tight current lead through at each of its two ends, a long stretched-out electrical heating conductor (helically coiled tungsten wire filament) in the heating tube 12 as a radiation source, a cooling element with one cooling channel (tubular outer sheath 14 around the heating tube enclosing a space through which cooling fluid is passed) and a metallic reflector (reflector coating) 54 having a reflective surface which when seen in cross section describes a line around a surface 56 (reflector applied to the outer surface 56 of the outer sheath), an opening for passage of liquid coolant provided in the region of the surface.

Regarding claim 2 Fannon et al. disclose (column 2 lines 59,60 Fig. 4) the reflector a layer of metal 54 (metal coating) and the cooling element is the outer sheath with cooling channel 52 (inner space around the heating tube) directly adjacent to the heating tube, the cooling channel being lined with the metal layer.

Regarding claim 3 Fannon et al. disclose (column 4 lines 58,59) the reflector being thin walled piece of metal (reflective coating typically less than a thousandth of an inch thick) and the cooling element is the outer sheath with cooling channel 52 (inner space around the heating tube) directly adjacent to the heating tube, the cooling channel being lined with the metal layer.

Regarding claim 5 Fannon et al. disclose (column 3 lines 3,4) the reflector has 50% of the circumference of the outer wall (a semicircular cross sectional shape).

Alternately claims 1,2, 5,6 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 1 531 406.

Regarding claim 1 DE 1 531 406 discloses (Fig. 1) a coolable infrared radiator comprising of one heating tube 3 having gas-tight current lead-through 6,7 at each of two ends , an electrically heat generating filament 5 , one cooling element 4 having cooling channel for a liquid coolant and a metallic reflector 12 on the outer surface of the cooling tube so that when seen in cross section the reflector describes a line around the surface, an opening for of the cooling channel passage.

Regarding claim 2 DE 1 531 406 discloses the reflector as a layer of metal and the cooling element is a cooling tube with at least one cooling channel directly adjacent to the heating tube 3, the cooling channel being lined with the metal layer on one side.

Regarding claim 5 DE 1 531 406 discloses cooling element being metallic reflector enclosing 50% of the outer wall of the heating tube.

Regarding claim 6 DE 1 531 406 discloses (Fig.7 page 3 first column lines 8-10) dual chambers for the passage of the coolant having the advantage of applying high level of electrical power to the conductor as a result of vigorous cooling.

Referring to claim 14 DE 1 531 406 discloses (Fig.3) the two gas-tight current lead-throughs of the heating tube in the same direction and parallel to each other.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U. S.

Patent 5,382,805 to Fannon et al. ('382) in view of U. S. Patent 6,399,955 to Fannon et al. ('955)

Regarding claim 4 Fannon et al. ('382) do not disclose the thin-walled metal part being inserted into the cooling tube (tubular outer sheath).

Fannon et al. ('955) in analogous art of infrared emitter disclose (column 4 lines 25-28, Fig. 12) an infrared emitter having the reflector formed on the inside of the outer tube. It is to be noted that this design aids more effective cooling of the reflector being in direct contact of the cooling fluid in the tube.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the thin-walled reflector being inserted into the cooling tube of Fannon et al. ('382) as suggested by Fannon et al. ('955) for more effective cooling of the reflector being in direct contact of the cooling fluid in the tube.

Claims 7 - 9 and 15,16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,382,805 to Fannon et al. ('382) in view of U. S. Patent 4,588,923 to Hoegler et al.

Regarding claims 7 and 8 Fannon et al. ('382) do not disclose the heating tube filled with inert gas doped with halogen doping agent ammonium bromide or copper bromide.

Hoegler et al. in pertinent art of tubular heat lamps disclose (column 4 lines 56-66) the heat tube filled with a suitable inert gas with a small quantity of bromide doping. It is disclosed that the function of the halide doping agent such as bromine is to set up a regenerative cycle which removes any darkening deposit of tungsten on the envelope wall and redeposits on the filament.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the halogen gas fill in the heating tube of Fannon et al. ('382) by a suitable inert gas doped with a bromide agent for removing any darkening deposit of tungsten on the envelope wall and re-depositing on the filament.

Regarding claim 9 Fannon et al. disclose the claimed invention except for the limitation of diameter of the connecting lead being so that lead heats up to a temperature range between 600° and 800° C. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the diameter of the connecting lead so that lead heats up to a temperature range between 600° and 800° C, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 15 Hoegler et al. disclose (column 3 lines 25-28) the inside diameter (outside diameter – wall thickness) of the heating tube being in the range of about 6.9 mm to 8.5mm. Fannon et al. and Hoegler discloses the claimed invention except for the limitation of inside diameter being of about 10 to 17mm. It has been held

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that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select inside diameter being of about 10 to 17mm, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 16 Fannon and Hoegler et al. disclose the heating conductor being coiled tungsten wire axially extending through the tubular envelope.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,382,805 to Fannon et al. ('382) in view of U. S. Patent 5,567,951 to Baschant.

Claims 10 and 11 differ from Fannon et al. ('382) in that Fannon et al. do not exemplify the heating conductor as carbon ribbon and the heating tube filled with noble gas or evacuated.

Baschant in relevant art of radiating apparatus disclose (column 1 lines 55-60) the heating conductor being of carbon ribbon (strips). It is further disclosed that carbon fibers retain their stability, conduct current and have high degree of emission at high temperature.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the tungsten wire of Fannon et al. by carbon ribbon as heat conductor as taught by Baschant. This provides the advantage of stability of the current carrying conductor and high degree of emission at high temperature. Regarding the limitation reciting fill gas being noble gas or inside being vacuum Baschant does not

exemplify on the fill gas and hence the heat conducting tube may have noble gas or vacuum inside having carbon ribbon as the conductor.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,382,805 to Fannon et al. ('382) in view of U. S. Patent 5,091,632 to Hennecke et al.

Regarding claim 12 Fannon et al. do not exemplify first and second heating tubes present with a part of the wall surface of the first heating tube being simultaneously being the wall surface of the second heating tube.

Hennecke et al. in analogous art of infrared radiator disclose (Figure, column 2 lines 36-44, column 3 lines 25-30) two heating tubes with a part of the wall surface of the first being simultaneously a wall surface of the second tube. Hennecke et al. disclose this compact construction is advantageous for graphic purposes along with its uniform high intensity radiation covering the partial length. Since the two radiator segments are joined via small area of the partition wall the resulting unheated area is consequently small.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the single heating radiator tube of Fannon et al. by two heating tubes with a part of the wall surface of the first being simultaneously a wall surface of the second tube as taught by Hennecke et al. for providing the advantage of compact composition and high intensity radiation useful for graphic purposes.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,382,805 to Fannon et al. ('382).

Regarding claim 13, Fannon et al. discloses the claimed invention except for the limitation of heating tube and cooling element being curved. It has been held that a change in shape is generally recognized as being within the level of ordinary skill in the art. It would have been obvious to one having ordinary skill in the art to change the linear shape of the heating tube and the cooling tube to curved one, since such a modification would have involve a mere change in the shape.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art references are cited to further show the state of the art with respect to infrared heaters.

U. S. Patent 3,627,989 to Heidler et al.

U. S. Patent 4,598,194 to Halberstadt et al.

U. S. Patent 4,839,559 to Ahlgren et al.

U. S. Patent 5,867,630 to Kreuter et al.

U. S. Patent 6,122,438 to Scherzer et al.

U. S. Patent 6,057,532 to Dexter et al. discloses infrared radiation source using carbon fibers.

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Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (703) 308-2826. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (703) 305-4794. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Sikha Roy
Patent Examiner
Art Unit 2879

Nimeshkumar D. Patel
Primary Examiner